

# PATENT ABSTRACTS OF JAPAN

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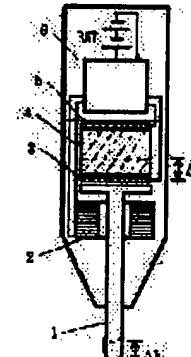
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## (54) PEN INPUT TYPE DATA PROCESSOR

### (57)Abstract:

**PURPOSE:** To plot various shapes of diagrams and characters on display screen by decoding the position of a pen position sensor based on the signal fetched from this sensor and also decoding an intermittent pattern that is formed by detection to decide the thickness of the lines which are shown on a flat panel.

**CONSTITUTION:** A lower (mobile) electrode 3 is provided on the extended axis of a pen, and a fixed electrode 5 is provided on the axis of the pen and opposite to the electrode 3. A conductive rubber 4 is provided between both electrodes 3 and 5 as a pressure sensor. And, a pen position sensor is put on a flat panel display screen. The radio waves are intermittently outputted from the pen point 1 in plural types of patterns and based on the output signal of the pressure sensor to which the writing pressure of the point 1 is transmitted in coupling to the point 1, and the position of the pen position sensor is decoded by the signal fetched by the sensor and an intermittent pattern which is formed by detection is also decoded. Thus, the thickness of the lines displayed on a flat panel can be decided.



## LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] A flat panel display and the pen location detection sensor which detects the electric wave outputted from this display screen and a heavy doubling \*\*\*\*\* nib, The pen input unit to which it was made to change the output outputted from a nib by the control signal formed based on the output signal of the pressure sensor to which the writing pressure which joins a nib is told with two or more kinds of patterns, The pen input-method data processor characterized by including the control device which determines the size of the line which decodes the signal which detected with the positional information with the signal incorporated by the above-mentioned pen location detection sensor, and was formed, and is displayed on the above-mentioned flat panel.

[Claim 2] The above-mentioned pressure sensor is the pen input-method data processor of claim 1 characterized by being what connects with a nib, is prepared between the 1st electrode made movable corresponding to the writing pressure, and this 1st electrode and the 2nd fixed electrode which counters, consists of electrical conductive gum, and forms an output signal using the resistance value change of the electrical conductive gum in the above 1st and inter-electrode [ 2nd ].

[Claim 3] It is the pen input-method data-processing processor of claim 1 characterized by being a thing containing the rectangular coil with which the above-mentioned flat panel display is a liquid crystal display, and a pen location detection sensor consists of a large number prepared corresponding to the X-axis and the Y-axis of the display screen, or claim 2.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] About a pen input-method data processor, especially this invention is used for the thing using the flat panel as a display, and relates to an effective technique.

[0002]

[Description of the Prior Art] The writing pressure of a nib is turned on/off controlled with a switch, the electric wave outputted from the nib is incorporated by nib location detection SANSA, and there is a computer of the pen input which draws the diagram and alphabetic character corresponding to a locus of a nib by the positional information. About such a pen computer, there are issue "Nikkei electronics" \*\*\*\* 161 - a page 166 on Nikkei tuna UHIRU May 10, 1993, for example.

[0003]

[Problem(s) to be Solved by the Invention] By the conventional pen input approach, since there is only a function to only draw a diagram, only a simple diagram can be drawn. The invention-in-this-application person thought of enabling it to draw the diagram of various expressions, as a pressure detection function is added to a pen input unit and the size of the line displayed based on it can also be specified.

[0004] The purpose of this invention is to offer the pen input-method data processor which drawing the diagram of various expressions cut by easy actuation. The other purposes and the new description will become clear from description and the accompanying drawing of this specification along [ said ] this invention.

[0005]

[Means for Solving the Problem] It will be as follows if the outline of a typical thing is briefly explained among invention indicated in this application. That is, the flat panel display screen and a \*\*\*\*\* pen location detection sensor form, two or more kinds of patterns are made performing the electric-wave output outputted from the output signal machine \*\*\*\*\* nib of the pressure sensor to which the writing pressure which is interlocked with a nib and joins this nib is told intermittently, and the size of the line which decodes intermittent Pan who detected with the location with the signal incorporated by the above-mentioned pen location detection sensor, and was formed, and displays on the above-mentioned flat panel determines.

[0006]

[Function] according to the above-mentioned means, since two or more kinds of lines can be drawn corresponding to the writing pressure of a pen input unit, drawing the diagram and alphabetic character of various expressions on the display screen the same with drawing a line and an alphabetic character with a brush on space cuts.

[0007]

[Example] The outline sectional view of one example of the pen input unit concerning this invention is shown in drawing 1. The pen input unit of this example is used for a microcomputer of a pen input method which is mentioned later.

[0008] In this drawing, 1 is a nib, the shaft of a pen is prolonged as it is and the bottom electrode 3 is formed. That is, although especially a nib is not restricted, the front face is covered in comparison with elastic synthetic resin with which a blemish does not stick to the display screen of a liquid crystal display panel which is mentioned later. Moreover, so to speak, the shaft containing a nib 1 has the role of an antenna, and the dispatch coil 2 is formed in the surroundings of a shaft. The umbrella-like electrode attachment section prepares in the other end side of the above-mentioned shaft, and an electrode 3 is attached in \*\* and its top face. Let an electrode 3 be the movable electrode which moves up and down in a shaft top corresponding to change delta of the height of a nib according to a motion (writing pressure) of a nib as mentioned above. On the shaft of the above-mentioned pen, a fixed electrode 5 is formed so that it may counter with the above-mentioned movable electrode 3.

[0009] Between the above-mentioned movable electrode 3 and a fixed electrode 5, the electrical conductive gum 4 as a pressure sensor is formed. That is, it is made to be put in electrical conductive gum between the two above-mentioned electrodes 3 and 5. Especially electrical conductive gum 4 consists of what mixed carbon and silicone rubber although not restricted, as shown in the property Fig. (A) of drawing 2, in proportion to a load, compressibility changes linearly, and as shown in a property Fig. (B), resistance becomes small in reciprocal ratio with non-linear characteristics at compressibility.

[0010] The above-mentioned two electrodes 3 and 5 are connected to the pen controller 6 by wiring. It connects also with the dispatch coil 2, and this pen controller 6 is driven by the above-mentioned pen controller 6, and outputs the signal of the gestalt of an electric wave from a nib. That is, the pen controller 6 detects the writing pressure of a nib, and makes the electric wave modulated by the signal formed by that cause output from a nib so that it may mention later.

[0011] The block diagram of one example of the pen input device concerning this invention is shown in drawing 3. It is used as

variable resistance R2, it connects with fixed resistance R1 and series-connected-type voice, and the above-mentioned electrical conductive gum 4 constitutes partial pressure circuits, such as supply voltage. the above-mentioned resistance R2 forms the partial pressure electrical potential difference which becomes small according to writing pressure being greatly alike, corresponding and the resistance of resistance R2 becoming small. Thus, the formed voltage signal is inputted into the analog / digital conversion circuit ADC of a controller 6, and is placed and changed into digital value.

[0012] A digital signal is supplied to Comparator CMP, it is compared with two or more kinds of reference values decided beforehand here, and two or more kinds of writing pressure is judged. Although not restricted especially, it is judged with the nib not touching the display screen with the 1st reference value, if small. If it is between the 1st criteria of the above, and the 2nd reference value with writing pressure higher than it, it is judged with the 1st writing pressure. If it is between the 2nd reference value of the above, and the 3rd reference value with writing pressure higher than it, it is judged with the 2nd writing pressure. If larger than the 3rd reference value of the above, it will be judged with the 3rd writing pressure.

[0013] A timing control circuit carries out dividing of it other than the oscillation signal outputted with the gestalt of an electric wave, and forms the timing signal of a frequency low enough compared with this oscillation signal. The above-mentioned timing signal is inputted into a counter circuit CNT, and the timing signal of criteria is formed.

[0014] Comparator CMP compares the writing pressure information judged by the comparison with two or more above kinds of criteria with the timing signal formed of the counter circuit CNT, and also performs actuation which transposes the writing pressure information which consists of binary data to a serial timing pulse. Switch SW is controlled by this timing pulse, and the oscillation signal formed of the oscillator circuit OSC is intermittently sent to the dispatch coil 2. That is, the above-mentioned comparator becomes irregular by the above-mentioned timing pulse, and makes the oscillation signal of an oscillator circuit OSC output as an electric wave.

[0015] The wave form chart of \*\* explaining actuation of the above-mentioned controller is shown in drawing 4. The example of a display of the line corresponding to it is also doubled and drawn on this drawing with the wave form chart. As shown in (B), if the 3rd writing pressure is detected from the above 1st, the electric wave corresponding to the oscillation signal of the oscillation signal OSC which shows that a nib is contacted in the display screen and is will be outputted to a fixed period by making fixed time amount into a unit. next -- the time of the 1st writing pressure -- 20 from -- 23 up to -- 4-bit data are assigned to the timing set up so that it might have binary weight, and dispatch of an intermittent electric wave which is explained below corresponding to these data is performed.

[0016] For example, if 4 above-mentioned bits data are defined like 0000 at the time of the 1st writing pressure of the above, since the output of an electric wave will be stopped in the timing of the bit corresponding to 0 assigned to each bit, in the data of the above 0000, the output of an electric wave is stopped over the time amount corresponding to the timing for 4 bits. The output of an electric wave is carried out to a being [ nib / a nib is contacted in the display screen and ]-after that, \*\*\*\* sake at a fixed period. An indication on the display screen corresponding to the signal from such a pen input unit is given a thin line as shown in (A).

[0017] At the time of the 2nd writing pressure of the above, 4 above-mentioned bits data are defined like 1001. Since the output of an electric wave is stopped in the part corresponding to 0 like the above in the timing assigned to each bit, the output of an electric wave is stopped over the time amount corresponding to the middle timing for 2 bits. The output of an electric wave is carried out to a being [ nib / a nib is contacted in the display screen and ]-after that, \*\*\*\* sake at a fixed period. An indication on the display screen corresponding to the signal from such a pen input unit is given the line of inside \*\* as shown in (A).

[0018] At the time of the 2nd writing pressure of the above, 4 above-mentioned bits data are defined like 0100. Since the output of an electric wave is stopped in the part corresponding to 0 like the above in the timing assigned to each bit, it divides into the time amount corresponding to 1 bit of the beginning, the 3rd, and the timing for the 4th bit, and the output of an electric wave is stopped. The output of an electric wave is carried out to a being [ nib / a nib is contacted in the display screen and ]-after that, \*\*\*\* sake at a fixed period. An indication on the display screen corresponding to the signal from such a pen input unit is given a thick wire as shown in (A).

[0019] The outline block diagram of one example of the data processor of the pen input method concerning this invention is shown in drawing 5.

[0020] In this example, a liquid crystal display is used as a display of a flat panel. this liquid crystal display and \*\*\*\*\* -- pen location detection SANSA is prepared in a rear-face side like. This pen location detection sensor consists of a tablet with which it comes to prepare the rectangular coil which acts as a loop antenna in the direction of X and the direction of Y of the display screen in a solenoid operated system like said example. The reinforcement of a received electric wave is lost through death with this loop antenna, and the positional information specified by X coordinate and Y coordinate is acquired.

[0021] The output of the pen location detection sensor of this example besides the positional information which is inputted into location detection equipment and consists of X and the Y coordinate of the above nibs the received electric wave is detected, the pattern of the intermittent output is judged, and the 1st writing pressure and when short [ the time amount which is not received is long, and ], the 2nd writing pressure and the time amount which is not received judge like the 3rd writing pressure twice at the time of division \*\*\*\*\*.

[0022] This positional information and writing pressure information are sent to a display control, and the diagram information corresponding to the locus and writing pressure of a nib is written in the frame memory prepared in it with the gestalt of a dot. And synchronizing with the display timing of a liquid crystal display, the above-mentioned FUMOMU memory is read and a diagram is drawn on the display screen.

[0023] Although not restricted especially, it connects with the central processing unit for data processing (microprocessor), and

the microcomputer system MCU containing a memory circuit, and processing of data including the diagram by the above-mentioned pen input is performed to a display control. In addition, although a pen input unit draws a diagram, it may carry out pattern recognition of the alphabetic character written to others, it may be used for inputting an alphabetic character, and may be a thing. In this case, the function to change the size of a line by the above writing pressure by specifying alphabetic character input mode etc. may be stopped, and an alphabetic character may be altogether inputted by the line of the same size.

[0024] The operation effectiveness acquired from the above-mentioned example is as follows. Namely, (1) The flat panel display screen and a \*\*\*\*\* pen location detection sensor are formed. Two or more kinds of patterns are made to perform the electric-wave output outputted from a nib based on the output signal of the pressure sensor to which the writing pressure which is interlocked with a nib and joins this nib is told intermittently. By determining the size of the line which decodes intermittent Pan who detected with the location with the signal incorporated by the above-mentioned pen location detection sensor, and was formed, and is displayed on the above-mentioned flat panel. The effectiveness that drawing the diagram and alphabetic character of various expressions on the display screen as a line also draws an alphabetic character with a brush on space corresponding to the writing pressure of a pen input unit cuts is acquired.

[0025] (2) The effectiveness that it is lightweight and a durable pen input unit can be obtained is acquired by being prepared between the 1st electrode which was connected with the nib and made movable as a pressure sensor corresponding to writing pressure, and this 1st electrode and the 2nd fixed electrode which counters, and forming an output signal using the resistance value change of the electrical conductive gum in the above 1st and inter-electrode [ 2nd ] using electrical conductive gum.

[0026] (3) The effectiveness that the transfer with positional information and writing pressure information is attained is acquired by the simple configuration of outputting an electric wave intermittently corresponding to the writing pressure detected as a pen input unit, by being made to perform location detection with a solenoid operated system using the coil of the rectangle which consists of a large number prepared as a pen location detection sensor corresponding to the X-axis and the Y-axis of the display screen, using a liquid crystal display as the above-mentioned flat panel display.

[0027] Although invention made from this invention person above was concretely explained based on the example, it cannot be overemphasized that it can change variously in the range which the invention in this application is not limited to said example, and does not deviate from the summary. For example, various operation gestalten, such as what uses as a dielectric rubber besides the thing using semi-conductor piezo-electricity SANSA which used the piezoelectric effect as a piezo-electric sensor which forms the electrical signal corresponding to writing pressure, or the thing using the resistance value change of electrical conductive gum, and uses the electrostatic-capacity value change inversely proportional to the distance between two electrodes, can be taken.

[0028] It changes into an analog / digital conversion circuit ADC, the reference voltage corresponding to two or more kinds of writing pressure is directly distinguished with two or more window comparators, the output performs said same modulation, and it may be made to output as an electric wave in drawing 3. This modulation technique also carries out the frequency modulation of the carrier frequency besides the thing to which have binary weight with a timing signal as mentioned above, and an electric wave is made to output intermittently, and may make it output. That is, the oscillation frequency of an oscillator circuit OSC itself is changed to two or more kinds by writing pressure, in location detection equipment, you perform frequency discrimination, and writing pressure information may be made to restore to it. The class of size of a line is good as for two kinds besides like said example three kinds, or four kinds or more.

[0029] As a liquid crystal display, the thing of a simple matrix method or the thing of the active-matrix method by TFT (thin film transistor) may be anything. In addition, what is necessary is just the display of a flat panel which can tell location detection SANSA in which the electric wave from the \*\* N point was prepared as mentioned above at the rear-face side. And besides the solenoid operated system of outputting the above electric waves and receiving, the electrode divided by X and Y may be formed by the ITO film on a transparent glass substrate, and the dielectric method that the AC signal around 100kHz impressed through the joint capacity of a pen and the ITO film calculates and deduces the location from the voltage ratio which appears in each electrode may be used.

[0030] This invention can be widely used for pen input-method data processors, such as a digitizer which performs data processing of the dedication only for only inputting the location and writing pressure other than the personal computer of a pen input method, and a microcomputer like the so-called electronic notebook.

[0031]

[Effect of the Invention] It will be as follows if the effectiveness acquired by the typical thing among invention indicated in this application is explained briefly. Namely, the flat panel display screen and a \*\*\*\*\* pen location detection sensor are formed. Two or more kinds of patterns are made to perform the electric-wave output outputted from the output signal machine \*\*\*\*\* nib of the pressure sensor to which the writing pressure which is interlocked with a nib and joins this nib is told intermittently. By determining the size of the line which decodes intermittent Pan who detected with the location with the signal incorporated by the above-mentioned pen location detection sensor, and was formed, and is displayed on the above-mentioned flat panel drawing the diagram and alphabetic character of various expressions on the display screen, as a line also draws an alphabetic character with a brush on space corresponding to the writing pressure of a pen input unit cuts.

[0032] The effectiveness that it is lightweight and a durable pen input unit can be obtained is acquired by being prepared between the 1st electrode which was connected with the nib and made movable as a pressure sensor corresponding to writing pressure, and this 1st electrode and the 2nd fixed electrode which counters, and forming an output signal using the resistance value change of the electrical conductive gum in the above 1st and inter-electrode [ 2nd ] using electrical conductive gum.

[0033] The transfer with positional information and writing pressure information is attained by the simple configuration of

outputting an electric wave intermittently corresponding to the writing pressure detected as a pen input unit, by being made to perform location detection with a solenoid operated system using the coil of the rectangle which consists of a large number prepared as a pen location detection sensor corresponding to the X-axis and the Y-axis of the display screen, using a liquid crystal display as the above-mentioned flat panel display.

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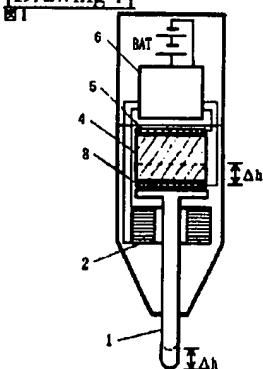
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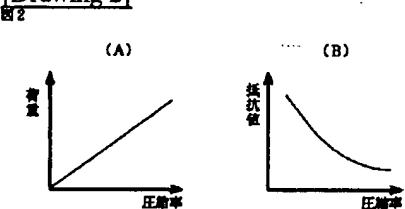
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DRAWINGS

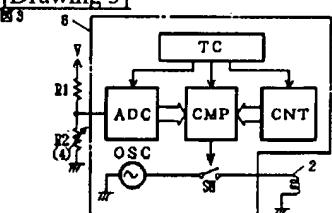
[Drawing 1]



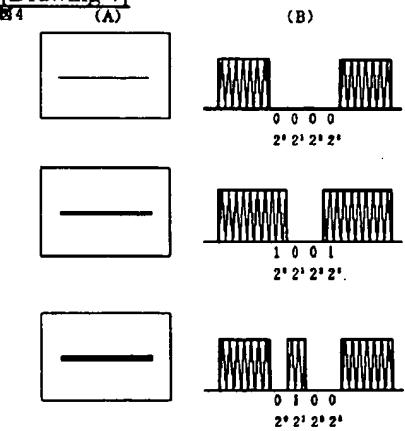
[Drawing 2]



[Drawing 3]

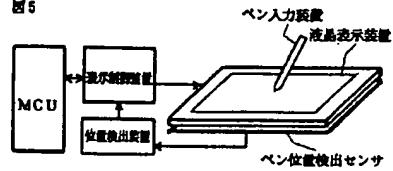


[Drawing 4]



[Drawing 5]

図5



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PRIOR ART

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[Description of the Prior Art] The writing pressure of a nib is turned on/off controlled with a switch, the electric wave outputted from the nib is incorporated by nib location detection SANSA, and there is a computer of the pen input which draws the diagram and alphabetic character corresponding to a locus of a nib by the positional information. About such a pen computer, there are issue "Nikkei electronics" \*\*\*\* 161 - a page 166 on Nikkei tuna UHIRU May 10, 1993, for example.

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EFFECT OF THE INVENTION

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[Effect of the Invention] It will be as follows if the effectiveness acquired by the typical thing among invention indicated in this application is explained briefly. That is, the flat panel display screen and a \*\*\*\*\* pen location detection sensor are formed, and a nib is interlocked with. With the signal which was made to perform the electric-wave output outputted from the output signal machine \*\*\*\*\* nib of the pressure sensor to which the writing pressure which joins this nib is told with two or more kinds of patterns intermittently, and was incorporated by the above-mentioned pen location detection sensor, the location, by determining the size of the line which decodes intermittent Pan detected and formed and is displayed on the above-mentioned flat panel, drawing the diagram and alphabetic character of various expressions on the display screen, as a line also draws an alphabetic character with a brush on space corresponding to the writing pressure of a pen input unit cuts.

[0032] The effectiveness that it is lightweight and a durable pen input unit can be obtained is acquired by being prepared between the 1st electrode which was connected with the nib and made movable as a pressure sensor corresponding to writing pressure, and this 1st electrode and the 2nd fixed electrode which counters, and forming an output signal using the resistance value change of the electrical conductive gum in the above 1st and inter-electrode [ 2nd ] using electrical conductive gum.

[0033] The transfer with positional information and writing pressure information is attained by the simple configuration of outputting an electric wave intermittently corresponding to the writing pressure detected as a pen input unit, by being made to perform location detection with a solenoid operated system using the coil of the rectangle which consists of a large number

FFECT OF THE INVENTION □on detection sensor corresponding to the X-axis and the Y-axis of the display screen, using a liquid display as the above-mentioned flat panel display.

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**MEANS**

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[Means for Solving the Problem] It will be as follows if the outline of a typical thing is briefly explained among invention indicated in this application. That is, the flat panel display screen and a \*\*\*\*\* pen location detection sensor form, two or more kinds of patterns are made performing the electric-wave output outputted from the output signal machine \*\*\*\*\* nib of the pressure sensor to which the writing pressure which is interlocked with a nib and joins this nib is told intermittently, and the size of the line which decodes intermittent Pan who detected with the location with the signal incorporated by the above-mentioned pen location detection sensor, and was formed, and displays on the above-mentioned flat panel determines.

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.....  
OPERATION  
.....

[Function] according to the above-mentioned means, since two or more kinds of lines can be drawn corresponding to the writing pressure of a pen input unit, drawing the diagram and alphabetic character of various expressions on the display screen the same with drawing a line and an alphabetic character with a brush on space cuts.

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EXAMPLE

[Example] The outline sectional view of one example of the pen input unit concerning this invention is shown in drawing 1. The pen input unit of this example is used for a microcomputer of a pen input method which is mentioned later.

[0008] In this drawing, 1 is a nib, the shaft of a pen is prolonged as it is and the bottom electrode 3 is formed. That is, although especially a nib is not restricted, the front face is covered in comparison with elastic synthetic resin with which a blemish does not stick to the display screen of a liquid crystal display panel which is mentioned later. Moreover, so to speak, the shaft containing a nib 1 has the role of an antenna, and the dispatch coil 2 is formed in the surroundings of a shaft. The umbrella-like electrode attachment section prepares in the other end side of the above-mentioned shaft, and an electrode 3 is attached in \*\* and its top face. Let an electrode 3 be the movable electrode which moves up and down in a shaft top corresponding to change delta of the height of a nib according to a motion (writing pressure) of a nib as mentioned above. On the shaft of the above-mentioned pen, a fixed electrode 5 is formed so that it may counter with the above-mentioned movable electrode 3.

[0009] Between the above-mentioned movable electrode 3 and a fixed electrode 5, the electrical conductive gum 4 as a pressure sensor is formed. That is, it is made to be put in electrical conductive gum between the two above-mentioned electrodes 3 and 5. Especially electrical conductive gum 4 consists of what mixed carbon and silicone rubber although not restricted, as shown in the property Fig. (A) of drawing 2, in proportion to a load, compressibility changes linearly, and as shown in a property Fig. (B), resistance becomes small in reciprocal ratio with non-linear characteristics at compressibility.

[0010] The above-mentioned two electrodes 3 and 5 are connected to the pen controller 6 by wiring. It connects also with the dispatch coil 2, and this pen controller 6 is driven by the above-mentioned pen controller 6, and outputs the signal of the gestalt of an electric wave from a nib. That is, the pen controller 6 detects the writing pressure of a nib, and makes the electric wave modulated by the signal formed by that cause output from a nib so that it may mention later.

[0011] The block diagram of one example of the pen input device concerning this invention is shown in drawing 3. It is used as variable resistance R2, it connects with fixed resistance R1 and series-connected-type voice, and the above-mentioned electrical conductive gum 4 constitutes partial pressure circuits, such as supply voltage. the above-mentioned resistance R2 forms the partial pressure electrical potential difference which becomes small according to writing pressure being greatly alike, corresponding and the resistance of resistance R2 becoming small. Thus, the formed voltage signal is inputted into the analog / digital conversion circuit ADC of a controller 6, and is placed and changed into digital value.

[0012] A digital signal is supplied to Comparator CMP, it is compared with two or more kinds of reference values decided beforehand here, and two or more kinds of writing pressure is judged. Although not restricted especially, it is judged with the nib not touching the display screen with the 1st reference value, if small. If it is between the 1st criteria of the above, and the 2nd reference value with writing pressure higher than it, it is judged with the 1st writing pressure. If it is between the 2nd reference value of the above, and the 3rd reference value with writing pressure higher than it, it is judged with the 2nd writing pressure. If larger than the 3rd reference value of the above, it will be judged with the 3rd writing pressure.

[0013] A timing control circuit carries out dividing of it other than the oscillation signal outputted with the gestalt of an electric wave, and forms the timing signal of a frequency low enough compared with this oscillation signal. The above-mentioned timing signal is inputted into a counter circuit CNT, and the timing signal of criteria is formed.

[0014] Comparator CMP compares the writing pressure information judged by the comparison with two or more above kinds of criteria with the timing signal formed of the counter circuit CNT, and also performs actuation which transposes the writing pressure information which consists of binary data to a serial timing pulse. Switch SW is controlled by this timing pulse, and the oscillation signal formed of the oscillator circuit OSC is intermittently sent to the dispatch coil 2. That is, the above-mentioned comparator becomes irregular by the above-mentioned timing pulse, and makes the oscillation signal of an oscillator circuit OSC output as an electric wave.

[0015] The wave form chart of \*\* explaining actuation of the above-mentioned controller is shown in drawing 4. The example of a display of the line corresponding to it is also doubled and drawn on this drawing with the wave form chart. As shown in (B), if the 3rd writing pressure is detected from the above 1st, the electric wave corresponding to the oscillation signal of the oscillation signal OSC which shows that a nib is contacted in the display screen and is will be outputted to a fixed period by making fixed time amount into a unit. next -- the time of the 1st writing pressure -- 20 from -- 23 up to -- 4-bit data are assigned to the timing set up so that it might have binary weight, and dispatch of an intermittent electric wave which is explained below corresponding to these data is performed.

[0016] For example, if 4 above-mentioned bits data are defined like 0000 at the time of the 1st writing pressure of the above, since the output of an electric wave will be stopped in the timing of the bit corresponding to 0 assigned to each bit, in the data of

the above 0000, the output of an electric wave is stopped over the time amount corresponding to the timing for 4 bits. The output of an electric wave is carried out to a being [ nib / a nib is contacted in the display screen and ]-after that, \*\*\*\* sake at a fixed period. An indication on the display screen corresponding to the signal from such a pen input unit is given a thin line as shown in (A).

[0017] At the time of the 2nd writing pressure of the above, 4 above-mentioned bits data are defined like 1001. Since the output of an electric wave is stopped in the part corresponding to 0 like the above in the timing assigned to each bit, the output of an electric wave is stopped over the time amount corresponding to the middle timing for 2 bits. The output of an electric wave is carried out to a being [ nib / a nib is contacted in the display screen and ]-after that, \*\*\*\* sake at a fixed period. An indication on the display screen corresponding to the signal from such a pen input unit is given the line of inside \*\* as shown in (A).

[0018] At the time of the 2nd writing pressure of the above, 4 above-mentioned bits data are defined like 0100. Since the output of an electric wave is stopped in the part corresponding to 0 like the above in the timing assigned to each bit, it divides into the time amount corresponding to 1 bit of the beginning, the 3rd, and the timing for the 4th bit, and the output of an electric wave is stopped. The output of an electric wave is carried out to a being [ nib / a nib is contacted in the display screen and ]-after that, \*\*\*\* sake at a fixed period. An indication on the display screen corresponding to the signal from such a pen input unit is given a thick wire as shown in (A).

[0019] The outline block diagram of one example of the data processor of the pen input method concerning this invention is shown in drawing 5.

[0020] In this example, a liquid crystal display is used as a display of a flat panel. this liquid crystal display and \*\*\*\*\* -- pen location detection SANSA is prepared in a rear-face side like. This pen location detection sensor consists of a tablet with which it comes to prepare the rectangular coil which acts as a loop antenna in the direction of X and the direction of Y of the display screen in a solenoid operated system like said example. The reinforcement of a received electric wave is lost through death with this loop antenna, and the positional information specified by X coordinate and Y coordinate is acquired.

[0021] The output of the pen location detection sensor of this example besides the positional information which is inputted into location detection equipment and consists of X and the Y coordinate of the above nibs the received electric wave is detected, the pattern of the intermittent output is judged, and the 1st writing pressure and when short [ the time amount which is not received is long, and ], the 2nd writing pressure and the time amount which is not received judge like the 3rd writing pressure twice at the time of division \*\*\*\*\*.

[0022] This positional information and writing pressure information are sent to a display control, and the diagram information corresponding to the locus and writing pressure of a nib is written in the frame memory prepared in it with the gestalt of a dot. And synchronizing with the display timing of a liquid crystal display, the above-mentioned FUMOMU memory is read and a diagram is drawn on the display screen.

[0023] Although not restricted especially, it connects with the central processing unit for data processing (microprocessor), and the microcomputer system MCU containing a memory circuit, and processing of data including the diagram by the above-mentioned pen input is performed to a display control. In addition, although a pen input unit draws a diagram, it may carry out pattern recognition of the alphabetic character written to others, it may be used for inputting an alphabetic character, and may be a thing. In this case, the function to change the size of a line by the above writing pressure by specifying alphabetic character input mode etc. may be stopped, and an alphabetic character may be altogether inputted by the line of the same size.

[0024] The operation effectiveness acquired from the above-mentioned example is as follows. Namely, (1) The flat panel display screen and a \*\*\*\*\* pen location detection sensor are formed. Two or more kinds of patterns are made to perform the electric-wave output outputted from a nib based on the output signal of the pressure sensor to which the writing pressure which is interlocked with a nib and joins this nib is told intermittently. By determining the size of the line which decodes intermittent Pan who detected with the location with the signal incorporated by the above-mentioned pen location detection sensor, and was formed, and is displayed on the above-mentioned flat panel. The effectiveness that drawing the diagram and alphabetic character of various expressions on the display screen as a line also draws an alphabetic character with a brush on space corresponding to the writing pressure of a pen input unit cuts is acquired.

[0025] (2) The effectiveness that it is lightweight and a durable pen input unit can be obtained is acquired by being prepared between the 1st electrode which was connected with the nib and made movable as a pressure sensor corresponding to writing pressure, and this 1st electrode and the 2nd fixed electrode which counters, and forming an output signal using the resistance value change of the electrical conductive gum in the above 1st and inter-electrode [ 2nd ] using electrical conductive gum.

[0026] (3) The effectiveness that the transfer with positional information and writing pressure information is attained is acquired by the simple configuration of outputting an electric wave intermittently corresponding to the writing pressure detected as a pen input unit, by being made to perform location detection with a solenoid operated system using the coil of the rectangle which consists of a large number prepared as a pen location detection sensor corresponding to the X-axis and the Y-axis of the display screen, using a liquid crystal display as the above-mentioned flat panel display.

[0027] Although invention made from this invention person above was concretely explained based on the example, it cannot be overemphasized that it can change variously in the range which the invention in this application is not limited to said example, and does not deviate from the summary. For example, various operation gestalten, such as what uses as a dielectric rubber besides the thing using semi-conductor piezo-electricity SANSA which used the piezoelectric effect as a piezo-electric sensor which forms the electrical signal corresponding to writing pressure, or the thing using the resistance value change of electrical conductive gum, and uses the electrostatic-capacity value change inversely proportional to the distance between two electrodes, can be taken.

[0028] It changes into an analog / digital conversion circuit ADC, the reference voltage corresponding to two or more kinds of writing pressure is directly distinguished with two or more window comparators, the output performs said same modulation, and it may be made to output as an electric wave in drawing 3. This modulation technique also carries out the frequency modulation of the carrier frequency besides the thing to which have binary weight with a timing signal as mentioned above, and an electric wave is made to output intermittently, and may make it output. That is, the oscillation frequency of an oscillator circuit OSC itself is changed to two or more kinds by writing pressure, in location detection equipment, you perform frequency discrimination, and writing pressure information may be made to restore to it. The class of size of a line is good as for two kinds besides like said example three kinds, or four kinds or more.

[0029] As a liquid crystal display, the thing of a simple matrix method or the thing of the active-matrix method by TFT (thin film transistor) may be anything. In addition, what is necessary is just the display of a flat panel which can tell location detection SANSA in which the electric wave from the \*\* N point was prepared as mentioned above at the rear-face side. And besides the solenoid operated system of outputting the above electric waves and receiving, the electrode divided by X and Y may be formed by the ITO film on a transparent glass substrate, and the dielectric method that the AC signal around 100kHz impressed through the joint capacity of a pen and the ITO film calculates and deduces the location from the voltage ratio which appears in each electrode may be used.

[0030] This invention can be widely used for pen input-method data processors, such as a digitizer which performs data processing of the dedication only for only inputting the location and writing pressure other than the personal computer of a pen input method, and a microcomputer like the so-called electronic notebook.

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[Translation done.]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is the outline sectional view showing one example of the pen input unit concerning this invention.

[Drawing 2] It is a property Fig. for explaining piezo-electric SANSA used for this invention.

[Drawing 3] It is the block diagram showing one example of the pen input device concerning this invention.

[Drawing 4] It is a wave form chart for explaining an example of actuation of the pen input unit concerning this invention.

[Drawing 5] It is the outline block diagram showing one example of the data processor of the pen input method concerning this invention.

[Description of Notations]

1 [ -- Electrical conductive gum, 5 / -- A fixed electrode, 6 / -- A pen controller, ADC / -- An analog / digital conversion circuit, CMP / -- A comparator, TC / -- A timing control circuit, CNT / -- A counter circuit, OSC / -- An oscillator circuit, SW / -- A switch, R2 / -- Variable resistance, R1 / -- Fixed resistance, MCU / -- Microcomputer. ] -- A nib, 2 -- A dispatch coil, 3 -- A movable electrode, 4

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[Translation done.]